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ABSTRACT

After more than three decades of development and two decades of evaluation, career academies have been found to be effective in improving the performance of students in high school, particularly for students at greatest risk. Career academies have become the most durable and best-tested component of a high school reform strategy that includes dividing large schools into smaller units. The number of career academies has been expanding rapidly because they have been found to be effective and because they embody ideas promoted by several major high school reform movements, including school-to-work advocates, the Coalition of Essential Schools, and the small schools movement. Today most career academies combine a college prep curriculum with a career-related theme and occupational training partnerships with employers. Most of their students attend four-year colleges. (Six tables list the findings of various studies of career academy growth; performance of career academy students and graduates; academic performance and high school completion of students in career academies compared to other students; postsecondary education enrollment of career academy graduates; employment rates after high school of students in career academies compared to other students; and effects of dividing large high schools into smaller subunits. A list of 65 references is included.) (KC)

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University of California at Berkeley

Career Academies:

Building Blocks For Reconstructing American High Schools

David Stern, Charles Dayton, and Marilyn Raby

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CAREER ACADEMIES:

BUILDING BLOCKS

FOR RECONSTRUCTING

AMERICAN HIGH SCHOOLS

David Stern, Charles Dayton, and Marilyn Raby

University of California at Berkeley

October 2000

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CAREER ACADEMIES: BUILDING BLOCKS FOR RECONSTRUCTING AMERICAN HIGH SCHOOLS

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CAREER ACADEMIES: BUILDING BLOCKS FOR RECONSTRUCTING AMERICAN HIGH SCHOOLS

"If I hadn't gotten into the academy, my life would be so much different than it is now! It has helped me so much, because I didn't really talk to people that much, and I was very shy. I know it's hard to believe that but I was! I wouldn't be as active in school as I am now, so I just feel as though I'm glad I got into the academy because, you know, all the opportunity I have now, it would never have been possible." (Career academy senior, quoted by Poglinco 1998, p. 15.)

"When I talk about the academy, I would very much highlight the fact that it sounds like all you do is work, you're college prep and everything like that, but actually it's not. Our first year, when we thought it was going to be very boring, we were hardly ever in the building because we'd go on field trips every two weeks, to get us more involved in what the academy is about. Instead of us just sitting in class and learning about it, they took us out and hands-on and said, 'Well, this is what we do and this is what you will do.' And that's one thing I can point out to them, it's not boring. It may be harder but it's not boring. They give you a lot of things to deal with and a lot of things to accomplish." (Career academy senior, quoted by Poglinco 1998, p. 13.)

SUMMARY

Career academies, after more than three decades of development and two decades of evaluation, have now been found by a conclusive random-assignment study to be effective in improving the performance of students in high school. Career academies have therefore become the most durable and best-tested component of a high school reform strategy that includes dividing large schools into smaller units.

The number of career academies has been expanding rapidly, in part because academies have been found to be effective, and in part because they embody ideas promoted by several major high school reform movements. This paper describes the growth and evolution of career academies, reviews the evaluation evidence, explains how career academies reflect widely accepted principles of high school reform, and considers prospects for the future.

GROWTH AND EVOLUTION OF CAREER ACADEMIES

In the first two decades after their 1969 inception, the growth of career academies was steady but gradual. Since about 1990, growth in the number of academies has accelerated.

Accurate counts of career academies are available only from three organized networks. In Philadelphia, the nonprofit Philadelphia Academies, Inc., has supported career academies since 1969. In California, after two nonprofit-sponsored academies were established in 1981, the state began funding academies in 1985. The nonprofit National Academy Foundation (NAF) has sponsored academies since 1982, and now supports academies in more than 30 different states. Table 1 shows that the number of academies in these three networks together grew to about a hundred in 1990, then expanded to more than 700 in 2000.

Table 1

Growth of Three Career Academy Networks

Year	Philadelphia	California*	National Academy Foundation
When founded	1969: 1 academy	1981: 2 academies	1982: 1 academy
1980	approximately 5	--	--
1985	approximately 10	12	8
1990	approximately 20	29	54
1995	28	45	167
1998	28	200	289
2000	29	290	400

* Includes only state-funded academies. Approximately an equal number of academies operate in California in 2000 without state funding.

In addition to these three networks, Illinois, Florida, Hawaii, and other states followed California's lead and began funding career academies in the 1990s. Another academy-building network started in 1997 at the Center for Research on the Education of Students Placed at Risk (CRESPAR), which includes career academies as a major component of the Talent Development High School model (LaPoint et al. 1996). Apart from these organized initiatives, an uncounted number of unaffiliated academies have sprung up independently across the country. The total number of career academies operating in U.S. high schools in 2000 almost certainly exceeds one thousand, and could well be two or three thousand.

Until the 1990s, career academies existed only as separate, small units within larger high schools. For example, a career academy might serve 200 students in a high school containing 2000. In the mid-1990s, however, a number of high schools decided to convert themselves entirely into career academies, or into various kinds of small learning communities (SLCs), some of which are career academies. Lee, Ready, and Johnson (1999) conducted an informal national canvass to identify high schools divided entirely into some kind of small learning environments. They identified 55 such high schools, 80 percent of which were using career academies as the model for the SLCs. CRESPAR's Talent Development High School is an example of this approach; every student in grades 10-12 belongs to a career academy.

What is a career academy?

A career academy is a type of school-within-a-school that provides a college-preparatory curriculum with a career-related theme. A precise national count of career academies has not been attempted, and would be difficult because there is no single, authoritative definition. We coined the term "career academy" in 1992 to encompass the Philadelphia academies, California partnership academies, and the NAF academies (Stern, Raby, and Dayton 1992). Only the California academies are defined in legislation. Nevertheless, these and other career academies generally share three basic features, as identified by researchers at the Manpower Demonstration Research Corporation (MDRC) (Kemple and Rock 1996, p. ES-3):

- First, academies are **small learning communities**. An academy comprises a cluster of students who have some of the same teachers for at least two years, and who share several classes each year. A group of teachers from academic and technical disciplines are scheduled to have only or mostly academy students in their classes, meet with each other on a regular basis, and share in decision-making related to administrative policies, curriculum content, and instruction. One of these faculty members assumes lead responsibility for administrative tasks and usually serves as a liaison to the school principal and other building administrators, school district officials, and employer partners.

- Second, academies combine a **college-preparatory curriculum with a career theme**. Examples of common themes are health care, business and finance, communications media, and transportation technology. Academic courses that meet high school graduation and college entrance requirements are linked with technical courses that focus on the academy's field of work. Teachers sometimes have shared planning time to coordinate course content and instructional strategies. Employability skills may be taught in the vocational courses and in one or more academic courses. Work-based learning opportunities for students tie classroom activities to internships with local employer partners. College and career counseling informs students about options and planning for employment and further education, which may or may not be related to the academy career theme.

- Third, academies embody **partnerships with employers**. An advisory group for the academy includes representatives from the local employer community, academy faculty, and the school district. Employer representatives give advice on curriculum, appear as guest speakers in classes, supervise student internships, provide financial or in-kind support, and sometimes serve as mentors for individual students.

Origin and development of career academies

The first academies began with a focus on dropout prevention and vocational preparation, but academies soon evolved to include preparation for four-year colleges and universities. Philadelphia established the first career academy in 1969: an "Electrical Academy" at Edison High School, sponsored in collaboration with the Philadelphia Electric Company. The idea was subsequently applied to other fields — business, automotive, health, environmental technology, law, horticulture, tourism, aviation — and other high schools, growing to a network of 29 academies in 12 different career areas. The separate nonprofit organizations that had mobilized employer support came together in 1982 as one organization, which is now called Philadelphia Academies, Inc. Supported by corporate contributions and foundation grants, this organization continues to coordinate and subsidize academies in Philadelphia, while the city school district retains jurisdiction and supplies teachers and classrooms. Although the Philadelphia academies began as vocational training programs, today they send most of their graduates to college.

In 1981 the academy idea was introduced in California, starting with a "Computer Academy" at Menlo-Atherton High School and an "Electronics Academy" at Sequoia High School, near Silicon Valley. Based on a series of evaluations that demonstrated improved student performance, California passed legislation in 1984 that supported ten replications of the model. Evaluations of these academies continued the pattern of encouraging results, and in 1987 a second state bill was passed, supporting approximately 40 additional replications. The legislation was renewed again in 1993 and 1999, with continued expansion to a total of 290 in 2000. These academies range over some 25 career fields. Many others have begun on their own, and in many districts there are now several non-funded academies for every one receiving a state grant, with an estimated 500 in all (no one has a precise count). The California Academies formalized the involvement of three academic courses as part of the model, along with one career-related course, in grades 10-12. They also advanced the notion of preparing students for college and careers at the same time.

Also in the 1980s, New York City created the first "Academies of Finance," sponsored by the American Express Company. American Express subsequently joined with other companies, which now number more than 100, to create the National Academy Foundation (NAF). NAF added the field of "Travel and Tourism" in 1987, "Public Service" in 1990, and "Information Technology" in 1999. NAF provides curriculum, technical support, and professional development for teachers. The NAF academies usually include only grades 11-12, but some individual NAF academies are moving toward the Philadelphia and California models, adding both earlier years of high school and more coordination with academic classes. NAF academies have been college-oriented since their inception.

In the 1990s a number of states and cities began to sponsor career academies. For instance, the Illinois State Board of Education started 20 California-style academies in 1994-95, expanding to about 50 in 2000. Cities with growing numbers of academies include Atlanta, Chicago, Denver, Sacramento, Seattle, Oakland, and Washington, D.C.

Career academies have evolved from an initial focus on traditional vocational education to preparation of high school students for both work and college. According to federal law and historical custom, vocational education traditionally has been directed toward occupations not requiring a bachelor's or advanced degree. Thus it has often been viewed by students and parents as a less desirable option than college prep. Growth in the proportion of jobs that require at least some postsecondary education has further reduced the attraction of traditional vocational education. In contrast, career academies provide broad information about an industry, exposing students to a range of careers requiring various amounts of formal education, and building a foundation on which to add more advanced and specialized postsecondary preparation. Most academies offer a rigorous academic curriculum that qualifies students for admission to a four-year college or university. By linking academic coursework to career themes and workplace experience, academies motivate students to stay in school and attend to their studies — as a number of evaluations have demonstrated.

EFFECTS OF CAREER ACADEMIES ON STUDENT PERFORMANCE

One good reason why growing numbers of states, districts, and schools have decided to start career academies is that they have been found to be effective in improving students' performance. This section summarizes the evidence to date, focusing on quantitative studies of student performance.[1] The studies and findings are summarized in Tables 2 through 5.

Several studies in California have found that academy students perform better than similar students in the same high schools who are individually matched with academy students on demographic characteristics and ninth grade records of low grades, high absenteeism, and disciplinary problems. An evaluation of the first two academies in California in the early 1980s found that academy students in grades ten through twelve had better attendance, earned more credits, obtained higher grades, and were more likely to graduate than the comparison groups (Reller 1984; additional citations in Stern, Raby, and Dayton 1992; see also Raby 1995). From 1985 through 1988 a similar evaluation of the ten initial state-funded academies in California showed substantial and statistically significant advantages for academy students in attendance, credits earned toward graduation, grade point averages, and retention through high school (Dayton et al. 1989; Stern et al. 1989).

Annual data collected from state-funded academies in California continue to show improvement after students enter an academy and while they are in it (Dayton 1997). High school dropout rates in academies average about 7 or 8 percent over three years — about half the rate in the general population of California students, despite the fact that state-funded academies are required to recruit a majority of students who are economically or educationally disadvantaged. Although these data describe only the performance of academy students, without comparison groups, they are consistent with the comparison-group evaluations.

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[1] Only results that have been published, or are about to be published, are summarized here. Several unpublished dissertations also contain descriptions and evaluations of academies.

Table 2

Published Quantitative Evidence on Performance of Students Who Participated in Career Academies

Author(s) and Date(s)	Data Source
Reller 1984, 1985, 1987	Data collected 1981-86 on students in 2 Peninsula Academies in California, and individually matched comparison groups in each school. Followup surveys 15 and 27 months after graduation.
Snyder & McMullan 1987a,b	1981 sophomores entering business academies in 3 Philadelphia high schools traced to graduation. Graduates surveyed late 1986-early 1987, and compared to random sample of all graduates, and all business program graduates, from those 3 high schools.
Stern, Dayton, Paik, Weisberg, & Evans 1988, 1989	Data collected 1985-90 on students in 10 academies funded by state of California, and individually matched comparison groups in each school.
Academy for Educational Development 1990	Followup of academy of finance students who graduated 1984-89. No comparison group.
Stern, Raby, & Dayton 1992	Followup surveys 10 and 22 months after graduation, of graduates from 10 state-funded California academies and comparison groups.
Hayward & Talmadge 1995	1989-92 data from 10 different programs using vocational education to promote high school success. Two of the sites are career academies. Evaluation used random control groups in some sites, non-random comparison groups in others, including the academies.

Table 2 (continued)

Published Quantitative Evidence on Performance of Students Who Participated in Career Academies

Author(s) and Date(s)	Data Source
McPartland, Legters, Jordan, & McDill 1996; McPartland, Balfanz, Jordan, & Legters 1998	Reorganization of Patterson H.S. in Baltimore in 1995 included creation of 4 career academies for grades 10-12. Data analyzed from 1993 to 1998.
Kemple and Snipes 2000	10 career academies included in an experimental evaluation since 1993. This is the only evaluation of career academies (or other high school restructuring strategy) with students randomly assigned to academies and control groups.
Maxwell and Rubin 1997, 2000	1991-95 school records for 3 cohorts of students in grades 10-12 in an urban district, including 9 career academies. Also a followup survey in mid-late 1996.
Hanser, Elliott, and Gilroy, forthcoming	1994-96 data from 3 Junior ROTC career academies in large cities were compared with data from other career academies or magnets in the same or similar schools, JROTC students not in academies, and students not participating in any academy or magnet.

Table 3

Findings on Academic Performance and High School Completion: Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1984, 1985	Academy students earned more course credits than comparison group. One-year dropout rates 2 to 6% in academies, 10 to 21% in comparison group.
Snyder & McMullan 1987b	Graduation rate for 1981 sophomores in 3 business academies was 77%, compared to citywide average of 67% for freshmen.
Stern, Dayton, Paik, Weisberg, & Evans 1988, 1989	Academy students overall performed significantly better than comparison groups in attendance, credits earned, average grades, and likelihood of staying in school. 3-year dropout rate for cohort entering 1985 was 7.3% in academies, 14.6% in comparison group.
Hayward & Talmadge 1995	Academies showed generally better results than other programs, improving students' attendance, credits, grades, and likelihood of completing high school.
McPartland, Legters, Jordan, & McDill 1996; McPartland, Balfanz, Jordan, & Legters 1998	Attendance in first implementation year rose from 71 to 77% at Patterson, compared to districtwide decline from 73 to 70% in grades 9-12. Survey of teachers found big improvement in reported school climate.
Kemple and Snipes 2000	Academy students overall earned a larger number of course credits and were more likely to have positive developmental experiences. Among students at highest risk of school failure, academy students attended school more regularly, earned more course credits, were more likely to participate in extracurricular activities and volunteer projects, and were less likely to be arrested. Dropout rate for the high-risk subgroup was reduced from 32 percent in the control group to 21 percent among the career academy students.
Maxwell and Rubin 1997, 2000	District records show academy students received higher grades. Followup survey found higher grades increased the likelihood of graduation; result was 92% graduation rate for academy students, 82% for non-academy.
Hanser, Elliott, and Gilroy, forthcoming	Students in JROTC career academies, and in other career academies or magnets, generally received higher grades, had better attendance, completed more credits, and were less likely to drop out, compared to statistically similar students not in academies.

Table 4

Findings on Enrollment in Postsecondary Education: Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1987	15 months after graduation, postsecondary enrollment rate 62% for academy graduates, 47% for comparison group. 55% of academy graduates, 22% of comparison group expected to complete bachelor's degree or more.
Snyder & McMullan 1987b	18% of business academy graduates said school was main activity in 1986-87, compared to 35% of citywide sample. Of those enrolled, 14% of academy graduates, and 43% of citywide sample, intended to get bachelor's degrees.
Academy for Educational Development 1990	89% of finance academy graduates said they had attended 4-year college or university, 58% majored in business or finance, and 67% planned to complete a master's or doctorate.
Stern, Raby, & Dayton 1992	1989 and 1990 followup surveys found no consistent differences between academy and comparison graduates in postsecondary attendance or degree aspirations.
Maxwell and Rubin 1997, 2000	Analysis of followup survey found higher grades for academy students increased their probability of going to college, and 2 of 9 academies gave an extra added boost to college-going, resulting in 52% of former academy students going to 4-year colleges, compared to 36% of non-academy.

Table 5

Findings on Employment After High School:
Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1987	No significant differences between academy and comparison students 27 months after graduation, in employment status, wages, or hours worked.
Snyder & McMullan 1987b	64% of business academy graduates said work was main activity in 1986-87, compared to 42% of citywide sample. Academy graduates employed a larger fraction of time since graduation.
Stern, Raby, & Dayton 1992	1989 and 1990 followup surveys of academy and comparison graduates found academy graduates working 3 more hours per week, but no consistent overall difference in hourly earnings.
Maxwell and Rubin 1997, 2000	Analysis of followup survey found no significant differences in wages or hours worked between former academy and non-academy students, but former academy students more often said their high school program had prepared them well for further education and work.

The California evaluations using individually matched comparison groups also followed students after they graduated from high school. Academy graduates were at least as likely to be enrolled in postsecondary education as their non-academy schoolmates one or two years after high school. At the same time, they had more hours of paid employment. Additional details are given in Stern, Raby, and Dayton (1992).

More recently, Maxwell and Rubin (1997) surveyed former high school students from a large California school district one or two years after their graduating year. They found that students who had attended career academies were at least as likely to be enrolled in four-year colleges as students who identified themselves as having been in the academic track in high school. Both the career academy and academic track graduates had significantly greater

likelihoods of enrolling in four-year college than graduates who classified themselves as having been in the high school general track. Yet academy students had lower average scores on sophomore reading tests in high school, and they were less likely to be native English speakers, compared to students in the general track.

Maxwell and Rubin (2000) also analyzed school district records on academy and non-academy students. They found that students in career academies obtained significantly better grades. This was not due to easier grading standards within the academies: Maxwell and Rubin found that courses within most of the academies actually awarded lower grades than non-academy courses in the same subjects. Furthermore, when Maxwell and Rubin divided students into high, middle, and low groups according to tenth grade math and English test scores, they found in each group that academy students obtained higher grades than non-academy students. The higher grades of academy students appear to be the main reason for their higher rate of college attendance, compared to non-academy students.

Maxwell (1999) extended the Maxwell-Rubin study to follow graduates of career academies and other graduates from the same school district who enrolled at a nearby campus of the state university. She found that the academy graduates were more likely to come from high schools with large proportions of low-income minority students. After taking this into account, the academy graduates were less likely to need remedial coursework at the university, and they were more likely to receive their bachelor's degrees, compared to the other graduates from the same district. These findings suggest that academies help low-income students finish not only high school, but also college. They imply that the improvement in high school graduation rates was not accomplished by lowering academic standards in the career academies.

Outside of California, an earlier evaluation of business academies in Philadelphia (Snyder and McMullan 1987b) found a higher graduation rate compared to the citywide average, but a lower rate of enrollment in postsecondary education for academy graduates than for the general student population, and no significant differences in employment after graduation compared to graduates of other business programs. On the other hand, an early

study of a NAF academy in New York City found high rates of postsecondary enrollment (Academy for Educational Development 1990). The difference apparently reflects the origin of the Philadelphia academies in traditional vocational education, while the NAF academies were designed as college preparatory from the outset. A subsequent study by Linnehan (1996) found that graduates from Philadelphia business academies reported better attendance while in high school, and that this carried forward into less reported absenteeism in their post-high school jobs.

Hanser, Elliott, and Gilroy (forthcoming) analyzed data from three career academies affiliated with the Junior Reserve Officers' Training Corps (JROTC). They found positive effects on attendance, credits earned, grades, and the likelihood of staying in high school.

Importance of the MDRC random-assignment study

An unresolved question in these evaluations — even in studies using individually matched comparison groups — was whether the positive results for academy students might be attributable to selection. Since students must take the initiative to apply to a career academy, it is possible that academy students have more motivation, ambition, get-up-and-go, parental support, or other unmeasured strengths than the comparison students. These unmeasured characteristics may have prompted some students to apply to a career academy and also made them more likely to succeed whether they enrolled in an academy or not.

The selection issue not only clouds previous research on career academies, but also bedevils evaluations of other high school reform efforts. For example, numerous studies have attempted to test the effects of reducing the size of high schools, either by creating separate small schools or by dividing large high schools into smaller units. These studies tend to find that students in small schools, or in smaller units within large schools, are relatively less alienated, more engaged, more likely to pass their courses and accumulate credits toward graduation, and less likely to drop out (Gladden 1998; Cotton 1996; Raywid 1995). However, it is possible that these patterns are largely attributable to pre-

existing differences between students in large and small schools, or between students who are and are not enrolled in small units within larger high schools — and these differences may not be measured by researchers. For example, students may differ with respect to individual characteristics such as motivation, or with respect to community characteristics such as homogeneity of values. Because of such differences, the students in small schools or schools-within-schools may have been more likely to succeed even if they had been in big schools.

For instance, several studies are frequently cited as demonstrating that students in smaller high schools are less likely to drop out (Pittman and Haughwout 1987; Franklin and Crone 1992; Fetler 1989; Howley and Bickel 1999). Each of these studies compares high schools in a state or national sample at one point in time.[2] The smaller high schools therefore may include: schools in small, close-knit rural communities; magnet high schools or other schools of choice in big cities; and schools located in relatively homogeneous residential enclaves in small cities or various parts of metropolitan areas. The characteristics of those communities — such as stronger personal connections and shared values between school staff and parents — may account for the lower dropout rates, and these characteristics are not captured by the simple socioeconomic measures used in the studies as statistical controls. The available research, based on comparisons across communities, therefore does not demonstrate that replacing a large high school with smaller high schools would produce lower dropout rates or other desirable results in a given community.[3] Like the previous research on career academies, the research on small high schools and other kinds of schools-within-schools is suggestive but not entirely conclusive.

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[2] Another study (Toenjes, 1989) cited in some reviews does not use individual school data, but makes inferences based on the number of high schools and total student enrollment in each district-size category.

[3] One study (Gottfredson 1985) did observe what happened in three schools that experienced major decreases in size, and two that experiences major increases, due to district reorganization. Dropout rates were not measured, but reports on various aspects of school safety, drug use, delinquency, and disorder were collected from student and teacher surveys. Results were very mixed. Reports of drug use and delinquency actually increased in two of the three schools that got smaller, and no significant changes in these outcomes occurred in the two schools that got bigger. On the other hand, teachers' reported feelings of safety improved in one of three schools that got smaller, and worsened in one of the two schools that got bigger. Students' reports of victimization by other students increased in one of the schools that got bigger, but also in one of the schools that got smaller.

The only way to eliminate the uncertainty due to unmeasured differences among students or communities is the experimental procedure of random assignment. This is standard practice in medical research, and is sometimes used in classroom-level studies in education, but it is very rare in studies of school structure (see Mosteller et al. 1996). That is why the MDRC study of career academies was so significant (and expensive). MDRC began its 10-site study in 1993 by creating a list of students who applied to the career academy at each site, and choosing at random those who would be admitted to the academy and those who would not. The latter constituted the control group. Unlike the matched comparison groups in earlier studies, all students in the MDRC control group had taken the initiative to apply to the career academy. They therefore shared the same unmeasured motivation, ambition, or other traits that might characterize the academy student.

The results of the MDRC evaluation strongly confirmed earlier findings from the matched-comparison studies of career academies. MDRC found that academy students overall earned a larger number of course credits needed for graduation, and were more likely to have positive developmental experiences such as working on a volunteer project. The strongest and most pervasive differences were found among students at highest risk of school failure. Among this subgroup, the academy students attended school more regularly, earned more course credits, were more likely to participate in extracurricular activities and volunteer projects, and were less likely to be arrested. Most consequentially, the dropout rate for the high-risk subgroup was reduced from 32 percent in the control group to 21 percent among the career academy students (Kemple and Snipes 2000).

In sum, the MDRC evaluation has produced conclusive evidence that career academies improve students' performance in high school, especially for students at greatest risk. Because the MDRC study controlled for selection effects by using random assignment, the evidence on the effectiveness of career academies is stronger and clearer than for any other high school reform strategy. This provides an exceptionally solid basis for designing new policies and practices to improve high schools.

Two issues raised by the MDRC study: test scores and schoolwide effects

Despite positive results, the MDRC study raised a couple of troubling issues, one explicit and the other implicit. The explicit issue is about test scores. MDRC found that career academy seniors scored no higher than students in the control group on standardized tests in mathematics and language arts (Kemple and Snipes 2000). Furthermore, previous studies of career academies have not examined effects on standardized test scores. The absence of evidence that career academies improve standardized test scores is serious because such tests are sometimes regarded as the best immediate measure of student learning.

It is important to recognize that the long-run benefit of career academies for participating students depends much more on reducing the dropout rate than on raising test scores. For instance, the additional earnings associated with completing one more year of high school are estimated to be four to ten times greater than the additional earnings associated with one grade-equivalent year of test score gain (Levin 2000) — and few if any replicable programs have been found capable of producing test score gains of that magnitude. Therefore, even if academy students' test scores are no higher than the control group's, career academies still provide substantial benefits by enabling more students to finish high school.

That said, MDRC's null finding about test scores raises questions about what kind of instructional improvement, if any, occurs in career academies. Poglinco (1998) analyzed interviews with students, teachers, and administrators from three of the academies in the MDRC study, to see whether academies were supporting students' college goals. One of the themes running through students' comments is that the atmosphere of trust and encouragement created within the academy, and with workplace mentors, bolstered their general self-confidence. College aspirations were seldom mentioned as a reason for entering the academy in grade nine or ten, but they became more explicit by junior year. This qualitative evidence amplifies results from surveys in which academy students reported more academic support from teachers and peers than the control group (Kemple 1997). However, none of these findings indicate whether the level of instruction in academies was more rigorous than in non-academy classes, or whether academy students actually learned more than the control group.

A second set of issues arising from the MDRC study and previous evaluations of career academies has to do with schoolwide effects. It is possible that an academy — or any other program that serves only some of the students in a school — attracts special resources, especially teachers who are highly committed, energetic, or talented. If so, students in the academy may gain at the expense of the rest of the school. The MDRC study did check on whether academy teachers were more experienced or better educated than their non-academy counterparts, and found no differences on average (Kemple and Rock 1996). However, because teachers were not randomly assigned to academies, there may well be unobserved differences in motivation, commitment, or other attributes related to good teaching. Furthermore, academy teachers had smaller classes (24 students on average) than non-academy teachers (26.7). It is possible, therefore, that the difference between the performance of academy and non-academy students is partly attributable to a shift of resources from the rest of the school to the academy.

Whether academy students' gains come at the expense of non-academy students can be determined only by comparing the schoolwide distribution of student performance before and after the academy is introduced into the school. Since it takes several years to get an academy up and running, this would mean monitoring trends in student performance over a period of years. During the study period, some students would leave the school, and new students would enroll. Changes in student performance might therefore be due to changes in composition of the student body, or to other changes occurring in the school — not to the creation of the academy. In short, it may not be possible to determine with certainty how creating an academy — or any other program serving only part of the students in a school — affects student performance schoolwide.

A related question is whether the benefits of career academies can be generalized to a broader student population. The MDRC study was restricted to the sub-population of students who chose to apply to an academy, in schools where academies served only a small proportion of the total student body. What are the effects on student performance of dividing a school into career academies or other kinds of small learning communities, and requiring <u>every</u> students to choose one? The MDRC study does not answer this question.

As noted earlier, a number of high schools have in fact divided themselves into various kinds of sub-units, and a large proportion of these are using career academies for some or all of their small learning communities. McPartland et al. (1996, 1998) have produced the first reported results of subdividing a high school entirely into career academies in grades 10-12. Patterson High School in Baltimore was slated for reconstitution because "it was one of the two worst high schools in the state of Maryland in 1994." (1996, p. 1) For example,

> "Small groups of unruly students were constantly roaming the halls and stairways, and repeated faculty efforts to bring order to the building were unsuccessful. Teachers, unable to maintain peace in the halls, retreated to their classrooms where they tried to do their best with the students in their rooms. They kept the doors of their rooms closed, and many papered over their door windows to shut out the outside confusion." (1996, p. 2)

With help from CRESPAR, Patterson reorganized itself into a set of academies: one for ninth graders, and four career academies for students in grades ten through twelve. Results in the first year included better student attendance and a turnaround in teachers' ratings of the school climate. Subsequently, students' performance on math proficiency tests also improved (McPartland et al. 1998). These preliminary results suggest that career academies can improve student performance when combined with other elements in a schoolwide strategy.

THE ROLE OF CAREER ACADEMIES IN RECONSTRUCTING AMERICAN HIGH SCHOOLS

Do American high schools really need reconstructing? We believe so. We are concerned that the proportion of young people who complete a regular high school diploma appears not to have increased since the 1960s[4] — while the economic penalty for not finishing high school has become more severe. We are concerned when we are in high schools and witness the palpable lack of engagement by students, even in affluent schools. We are concerned about the stubborn gaps between the achievement of students from different socioeconomic groups.

We realize that such a terse statement of concerns is not a diagnosis of the problems of high schools, and is not likely to change the mind of anyone who believes that American high schools are fine as they are, or as good as can be expected. Several of the sources cited in this paper provide more extensive analysis of high schools' shortcomings and proposals for fixing them (Sizer 1984, 1992; Fine and Somerville 1998; Grubb 1995; Steinberg 1998; Stern et al. 1992). We will not recapitulate those well-known arguments here.

Our purpose in this section is to describe several movements in which large numbers of teachers, administrators, parents, and students are working to change high schools. What matters is their concerns, not our concerns, because it is their concerns that drive much of the change that is happening in high schools. Our review of the evaluation evidence has shown that career academies are one of the most solid building blocks available for remaking American high schools. This is one reason why growth in the number of career academies has accelerated. Another reason is that these high school reform movements now are including career academies as elements of broader strategies. Three major

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[4] U.S. Department of Education (1999), Table 104 shows that the number of high school graduates each year as a proportion of the 17 year-old population reached a peak of about 77 percent in the 1960s, then declined during the 1970s and 1980s to about 70 percent in the 1990s. This decline was more than offset by the increase in the number of GED certificates awarded each year (Table 107), so that the proportion of 16-24 year-olds not holding either a regular diploma or a GED has steadily declined, according to household surveys (Table 108).

initiatives in which career academies have played a role are the school-to-work movement, the Coalition of Essential Schools, and the small-schools movement. Although each of these initiatives emphasizes a distinct set of ideas and practices, career academies share important common elements with all three.

School-to-work

The school-to-work movement derives its impetus from various sources, including foundation-sponsored programs starting in the 1980s, legislation enacted by various states in the early 1990s, and the federal School-to-Work Opportunities Act which passed in 1994 and gave the movement its name (Urquiola et al. 1997). Although advocates and participants in the school-to-work (or school-to-career) movement espouse a range of different purposes, some of the central issues were succinctly stated by Olson (1997):

> Today we teach students academic subjects out of context and then are perturbed when they ask, "Why do I have to learn this?" We hire young people without glancing at their high school transcripts and then wonder why they do not work harder in school. We sequester teens in high schools that are too big for them and then express dismay when they succumb to an adolescent peer culture. We tell young people to attend college to "get a job" but then offer little in the way of career guidance. We convince students that we are preparing them for the "real world" but make their education as removed from the adult society as possible.

School-to-work programs generally have attempted to make the high school curriculum more coherent and meaningful for students by creating various kinds of curricular pathways with career-related themes. Connections between the classroom and the work world have been reinforced by providing opportunities for job shadowing, internships, and other kinds of work-based learning. Many school-to-work programs also have sought to articulate high school courses with subsequent studies in two-year or four-year colleges. Despite the name, school-to-work programs usually have not been designed to train students for entry-level jobs right after high school — instead, they have attempted to prepare

students for postsecondary education while also equipping them with work-related knowledge and skill.

Career academies predated the school-to-work movement and exemplified ideas that the school-to-work movement sought to generalize: using career-related themes to increase the coherence of the high school curriculum; providing internships and other forms of workplace experience to connect classroom learning to the world beyond school; and preparing students for careers that include postsecondary education. For these reasons, the 1994 School-to-Work Opportunities Act explicitly named career academies as one of the "promising practices" for preparing all students both for further education and for careers that require a solid academic foundation. This was the first mention of career academies in federal legislation, and it helped stimulate interest in them.

The High Schools that Work (HSTW) project, which also predated the school-to-work movement and provided some of the basis for it, is another initiative in which career academies have played a part. Launched in 1987 by the Southern Regional Education Board with 13 states and 28 sites, HSTW had grown by 2000 to include approximately a thousand member high schools in 24 states. HSTW schools aim to combine challenging academic courses and modern vocational educational studies for the purpose of raising the achievement of high school students who are not enrolled in college-prep courses (Bottoms and Presson 1995). The HSTW initiative was originally designed to strengthen vocational programs, abandon the watered-down coursework associated with the general track, and rescue the "forgotten" students who make up more than half the population of most high schools in America (Southern Regional Education Board 1995). Over time, HSTW has evolved the concept of an academic, career, or blended major that contains an academic core and is connected to the world beyond school. Career academies are a natural means to accomplish these goals, and can be found in many HSTW member schools. Career academies have also been highlighted among the "best practices" recognized in HSTW schools (Southern Regional Education Board 1997).

In an attempt to broaden awareness of school-to-work principles as a basis for comprehensive high school reform, the U.S. Department of Education in 1996

began to identify a set of "New American High Schools." Additional schools have been recognized in subsequent years. Principles and practices represented in these schools have included preparing students for college and careers, learning in the context of a career major or other special interest, experiential learning in workplaces or community service, grouping students and teachers in small schools-within-schools, extra support from adult mentors outside of school, and strong links between high schools and postsecondary institutions. Since a number of these New American High Schools contain career academies (Visher and Hudis 1999), academies have gained additional recognition as a result of this program.

The Coalition of Essential Schools

A second major reform movement that has had widespread influence on American high schools is the Coalition of Essential Schools (CES). In contrast to the more utilitarian and future-oriented emphasis of the school-to-work movement, which has been focused on preparing students for college and careers, the fundamental concerns of CES are to improve the intellectual, social, and ethical quality of life for students and teachers while they are in high school. Based on the work of its founder, Theodore Sizer (1984, 1992), CES has formulated 10 common principles: learning to use one's mind well; less is more, depth over coverage; goals apply to all students; personalization of the student-teacher relationship; student as worker, teacher as coach; assessment of student learning through demonstration of mastery; a tone of decency and trust; commitment to the entire school; resources dedicated to teaching and learning; and democracy and equity.

Although a narrow vocationalism would be considered inimical to the goals of CES, career academies can in fact be found in a number of Coalition schools, and the kind of education offered by career academies has been endorsed in CES publications. For instance, Cushman et al. (1997) have written:

> A career academy promises a meaningful context for students' academic work across disciplines, a culture of high expectations derived from real-world standards, and a structure and opportunity for exploring the world

> of adults. Ideally, in academic and real-world contexts, students explore and master equivalent sets of intellectual and practical skills. They may apply the analytic methods of different academic disciplines, for example, to the problems of the health care system, or they may study the physics of building an electric car. In the process, they also acquire a more real sense of the nature of different work roles than casual observation can provide. They come to appreciate the learning that happens in many work settings. (p. 16)

In Boston, specifically, the authors observe that "school-to-career pathways or academies tend to attract ambitious students looking for a way to gain the academic background, mentoring, and real-world connections that will help them find a path into and through college to a career." (p. 18)

Because of their basic design, career academies are likely to fulfill several of the intellectual and ethical principles espoused by CES.[5] Career-related themes give focus and coherence to the curriculum, encouraging the analytical depth denoted by the CES dictum "less is more." Giving students opportunities to test and deepen their understanding of academic concepts through practical applications and work-based learning in career academies promotes the CES principles of engaging students as active "workers" and using demonstrations of authentic mastery to assess student learning. The effectiveness of career academies in improving the academic performance of high-risk students demonstrates their compatibility with the CES principle of justice and equity.

Most obviously, the organization of career academies as small learning environments within larger high schools enables students and teachers to form the more personal and caring relationships that CES considers necessary for good teaching and learning (Sizer 1984, 1992; Meier 1996). The MDRC evaluation did find, in fact, that students in career academies receive more personal attention and support from teachers, compared to non-academy students (Kemple 1997). Conchas (1998) has found that the feelings of affinity created among students in an urban career academy were strong enough to

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[5] For a broader discussion of how career-related themes andpractical applications can advance the intellectual and academic goals of schooling, see Grubb (1995) and Steinberg (1998).

overcome animosities among different racial and ethnic groups which caused problems in the rest of the school.

Small schools movement

The enthusiasm for small schools or small learning communities within large schools is shared not only by members of CES. Prominent researchers and educational authorities now include this idea among their proposals for improving American high schools (Darling-Hammond 1996; Noddings 1992; Sergiovanni 1994; National Association of Secondary School Principals 1996). Advocates urge the creation of new small schools and the breaking up of large schools into self-contained subunits (Fine 1994; Fine and Somerville 1998; Raywid 1995; Oxley 1989). For example, Fine writes:

> Across the country there is a revolution happening within the field of schooling. In urban areas, as well as suburban and rural communities, educators and parents are demanding, creating, and struggling to sustain small, neighborhood-based schools as schools of choice. There is growing literature, both scholarly and popular, that substantiates the positive effects of such small schools. We know that big schools often have harmful effects on many students, teachers, and parents, and that given the right conditions ... small schools can create an academic climate in which a sense of belonging and rich teaching and learning can flourish. (Fine and Somerville 1998, p. 2)

The U.S. Congress boosted the small schools movement by earmarking $45 million in the 2000 Appropriations Act for the Department of Education to fund a new Smaller Learning Communities Program through section 10105 of the Elementary and Secondary Education Act. The intent is to help local school districts "plan, develop, implement, or expand smaller, more personalized learning communities in large high schools" (U.S. Department of Education 2000, p. 3). The Clinton Administration proposed expanding the expenditure for this program to $120 million in fiscal 2001. At the same time, the Bill & Melinda Gates Foundation announced $56 million in grants to promote small schools or

smaller learning communities within larger schools, especially secondary schools (Gewertz 2000).

The small schools movement gives additional impetus to the spread of career academies, since these are one type of smaller learning environment. Some new small schools located in their own buildings may choose to organize their curricula around career-related themes. And as large high schools are subdivided into smaller units, some of these may be career academies.

For example, in 1988 Philadelphia began a massive, multi-year effort to divide its 22 comprehensive high schools into small learning communities called "charters" (Fine 1994). The Philadelphia academies, which had been steadily growing since 1969, were regarded as one kind of charter. A study by McMullan et al. (1994) found that 1,214 ninth graders were enrolled in academies in 1992-93, out of a total of 7,417 ninth graders enrolled in all charters. As relatively well established charters, the academies had a relatively high degree of curricular coherence and enrollment stability. Although they enrolled a relatively small share of ninth graders who were two or more years over age, repeating ninth grade, or taking more than one fourth of their courses in special education, the academies enrolled more than the districtwide percentage of ninth graders who qualified for compensatory education under Chapter 1 of the Elementary and Secondary Education Act.

Career academies as one element in multiple strategies

None of these high school reform movements would view career academies as a complete strategy for remaking high schools. (Neither would we.) But all three movements have used career academies as one component of the changes they are seeking.

The school-to-work movement has attempted to create large-scale institutional change that entails not only high schools but also postsecondary institutions, middle schools, employers, and government regulation of labor markets. In this large-scale vision, explicit skill standards and agreements between employers and schools govern and guide the formation of work-related

competence by individuals through multiple pathways. High schools are only one piece of this picture, but they are an important piece. And within the high schools, career academies are one of the clearest ways for students to obtain the kind of experience envisioned by the school-to-work movement: a curriculum that integrates academic and technical subject matter, work-based learning related to classroom studies, and explicit connections linking high school to postsecondary education and employment.

The Coalition of Essential Schools seeks to make high schools settings where students do serious intellectual work, while teachers endeavor to improve their pedagogical practices based on collective analysis of students' performance. Grouping students and teachers in career academies is neither necessary nor sufficient to produce this kind of learning community. But career academies have been recognized as one approach to facilitating the teacher-student relationships that make such a community possible.

Finally, the small-school movement is focused on creating new small schools or smaller units within large schools, in order to improve safety, sense of belonging, motivation, participation, and achievement. The thematic focus of a small school or school-within-a-school should emerge from the interests of teachers, students, and the local community. In some situations, high schools are being converted entirely to career academies, but this is not the most common solution. More often, career academies would represent only some of the options available in a high school that has grouped itself into small learning environments.

For these major ongoing movements aimed at transforming American high schools, career academies are not the whole answer. But increasingly they are seen as part of it.

WHAT ARE THE EFFECTS OF TRANSFORMING LARGE HIGH SCHOOLS INTO SETS OF SMALL LEARNING COMMUNITIES, INCLUDING CAREER ACADEMIES?

If students and teachers in large high schools are grouped into career academies or other kinds of schools-within-schools, what will be the effects on student performance? The MDRC study evaluated career academies in schools where most students were not enrolled in small learning communities. The results of that study pertain to students who applied to career academies in that context, and the findings cannot necessarily be extrapolated to high schools where all students are enrolled in career academies or other small learning environments.

Only a few studies have attempted to measure how student performance is affected by dividing high schools into smaller subunits. As we have already mentioned, McPartland et al. (1996, 1998) found preliminary evidence that grouping high school students and teachers into career academies in grades 10-12, along with other changes, led to improved attendance, school climate, and proficiency scores in mathematics. Given high rates of student turnover at that school, however, it is not clear to what extent the improvements are due to changes in the nature and characteristics of the student population.

Findings from three other studies are summarized in Table 6. These studies were done in New York, Philadelphia, and Chicago — three districts where substantial numbers of students have been enrolled in small learning environments within large high schools. The results are promising. In New York City, Oxley (1990) found small but consistent academic and social benefits for students in a large high school that had been divided into well-structured small learning environments (houses), compared to another large high school where the houses were less tightly structured. In Philadelphia, McMullan et al. (1994) discovered that ninth grade students in small learning communities, called charters, earned a larger percentage of the credits required for graduation than ninth graders who were not in charters. After adjusting for differences between the characteristics of charter and non-charter students, the advantage to charter

students became quite small — on the order of one-fourth of one year-long course — but it was still statistically significant.[6] The Chicago study by Wasley et al. (2000) found that students in schools-within-schools had fewer absences, higher grades, and lower one-year dropout rates than students in "non-small" high schools. In "multischools," where all students are in small learning environments, the absentee rate was lower, but the dropout rate was higher, compared to non-small schools.

These results, though promising, are not conclusive evidence that dividing a high school entirely into small learning environments improves student performance. The Philadelphia study combined high schools where all students are in charters with high schools where only some students are in charters. But charters in part-charter schools may select students who have high levels of motivation or other unmeasured characteristics that would make these students more likely to succeed even if they were not enrolled in charters. In all-charter schools, some charters may recruit the more motivated students, but then the less motivated students will be enrolled in other charters, so the selection effects cancel out when the analysis is done schoolwide. Including part-charter schools therefore may not give an accurate indication of the effects of enrolling students in all-charter schools.

The Chicago study did distinguish between part-SWS and all-SWS schools, but found that students in the all-SWS multischools do not always perform better. In particular, their one-year dropout rate is high. However, the authors observe that, unlike SWSs located in part-SWS schools, "the vast majority of SWSs located in multischools were built around grade levels, not themes" (p. 11). The Chicago study, therefore, does not indicate what would happen if entire high schools were divided into career academies or other kinds of thematic subschools that enroll students for more than one year.

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[6] This study also attempted to measure how the districtwide policy to create charters within comprehensive high schools affected districtwide student performance in grades 9-12, as measured by attendance, credits earned, and promotion rates. Surprisingly, although the proportion of students enrolled in charters rose steadily from 1988-89 to 1993-94, the trend in most of the student performance indicators was an initial rise for the first two or three years, followed by a leveling off or actual decline. The authors suggest that the gains due to charters may have been offset in the later years by changes in district policy that moved more over-age middle school students into high schools and also cut back on summer school.

Table 6

Studies on Effects of Dividing Large High Schools into Smaller Subunits

Author(s), Date, and Data Source	Main Findings
McMullan, Sipe, & Wolf 1994. Data from Philadelphia's comprehensive high schools during the first 5 years of the city's charter school program. Analysis focused on comparing charter to non-charter 9th grade students in the 1992/93 school year (N=7417 and 7765 respectively).	The average percentage of necessary credits (for promotion to grade 10) earned by 9th graders in 1992/93 was 15.3% higher for the average charter student than for the average non-charter student. Using ordinary least-squares (OLS) regression to control for differences in student demographics and prior school performance, the difference in average percentage of necessary credits earned was 3.4%. Using two-stage least-squares (TSLS), the difference was 4.1%. Restricting the comparison to charter students who took at least 3 courses in their home charter, the unadjusted difference was 24.4%, which was reduced to 9.5% after OLS adjustment and 5.8% after TSLS adjustment.
Oxley 1990. Data on 311 9th and 10th grade students collected through survey and on-site records from four New York City high schools during the 1988-89 school year.	Compared to students in a large high school without a tightly structured house system, students in another large high school with tightly structured houses showed small but consistent differences: they reported a stronger sense of community, participated in more extracurricular activities, cut fewer classes, earned more credits, and were more likely to be promoted. Results for students in a small school without tightly structured houses were similar to results for the large school with tightly structured houses, except that students in the small school were less likely to report a strong sense of community.
Wasley, Fine, Gladden, Holland, King, Mosak & Powell 2000. School records and survey data from Chicago public schools between 1997 and 1999. High school sample of small schools consisted of 22 schools-within-schools (SWS) located in 8 schools, 27 SWS located in 3 multischools (all-SWS schools), and 3 freestanding small schools. Comparison sample was 47 non-small high schools that did not contain any SWS.	Hierarchical Linear Modeling (HLM) was used to adjust for students' 8th grade achievement and demographics. Average days absent per semester in non-small high schools were 13.56, compared to 9.72 in freestanding small schools, 10.45 in multischools, and 8.09 in SWS. One-year dropout rate in 1999 from non-small high schools was 10.3, compared to 5.14 from freestanding small schools, 12.26 from multischools, and 6.07 from SWS. Grade-point average in non-small high schools was 1.96, compared to 1.98 in freestanding small schools and 2.11 in SWS.

Since growing numbers of high schools are now grouping students and teachers into smaller learning environments, it is important to find out whether this really helps students improve their academic performance. There are several reasons why the benefits of career academies or other small learning communities may not generalize when applied schoolwide. As we have already mentioned, one or two academies or SLCs within a larger high school may recruit students with relatively high levels of motivation, but if all students are enrolled in SLCs this would not be possible. Similarly, a single academy or SLC in a larger high school may attract relatively innovative and enthusiastic teachers, but if such teachers are in limited supply the results of their work would not be generalizable to an all-SLC high school.

Even if an academy or SLC in a school with only one or two SLCs does not recruit students or teachers who possess any special qualities, the mere fact that students and teachers choose to join the academy or SLC tends to create an esprit de corps that helps boost student achievement. If all students and teachers are told they must join an academy or other small learning environment, the element of voluntarism may be lost. Naysayers within the SLCs may undermine their effectiveness. Rivalries among SLCs also may threaten morale (Muncey and McQuillan 1996).

For career academies or other SLCs that require the active collaboration of employers or other community members or organizations, expanding to the entire high school may overload local capacity to provide internships, service learning opportunities, or other experiences outside the classroom. This would dilute the effectiveness of the career academies or other such programs.

In addition to the possibility that applying career academies or other SLCs schoolwide would reduce their average effect, it is also possible that the effects would be inequitably distributed. Tracking of students could take a new form. For instance, students in the most advanced classes might gravitate to the same academy or SLC, creating a hierarchical ordering among the academies and SLCs in the high school. As in traditional forms of tracking, the potential danger is that students in the less prestigious academies or SLCs would be systematically short-changed as teachers expected less of them (Oakes 1985; Mosteller et al.

1996). On the other hand, schools could monitor enrollment trends and intervene to prevent such results. Moreover, the fact that career academies and other thematically defined SLCs recruit students and teachers who share some common interest may make it easier to ensure that each academy or SLC enrolls students who represent a cross-section of the entire school.

In sum, rigorous evaluations have found that individual career academies within larger high schools help improve students' academic performance and reduce the number of students who drop out of high school. Approximately 1,500 to 2,000 career academies are now operating in high schools around the country. Growing numbers of high schools are now grouping all students and teachers into career academies or other kinds of small learning communities. Whether subdividing an entire high school into career academies or other small learning environments improves students' academic performance and reduces the number of dropouts is not yet known. This is one of the main questions on the frontier of knowledge about how best to redesign American high schools.

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